The Zone System of Photography

For *Perfect* Prints, Negatives, & Slides

Complete Instructions For The Use of 18% Gray Cards:

The Gray Card is specifically manufactured for the photographer and printer to aid in determining exposure, lighting ratios, and color balance. The Gray Card is manufactured to be neutral gray on one side. The gray side is designed to reflect 18% of the light hitting it.

Light meters and camera meters are calibrated to average the light reflecting off a scene so that the film will record the scene as average. The average scene will reflect approximately the same as a gray card or 18%. However, if the scene is not average, it is necessary to make an adjustment to the setting of your meter. This is the time to use your gray card. It will help you determine the proper exposure adjustments.

Using the Gray Card to Determine Exposure

First, it is important that the gray card and your subject are receiving the same illumination. Second, position the gray card so there are no shadows, glare, or hotspots on the card itself. By holding the meter approximately 6 inches from the card, you will get the appropriate reading of light reflecting off the card. With a camera that has a built-in meter, you can see exactly what you are reading. When making your measurement avoid casting a shadow on the card.

For Artificial Light—place the card close to and in front of the subject, aimed halfway between the main light and camera.
When Using Daylight—place the card in front of the subject, pointing at the camera. You can take your reading with the card near your camera if you place the card so it is in the same relationship to the light source as the subject.
If The Subject is Very Dark—increase your calculated exposure by 1/2 or 1 stop.
If The Subject is Very Light—decrease your calculated exposure by 1/2 to 1 stop.
If You are Unsure of the Best Exposure—use a bracketing technique to be sure you have the appropriate exposure.

Using the Gray Card to Determine Lighting Ratios

The relationship between main plus fill-in illumination and fill-in illumination alone expresses the Lighting Ratio. Generally this ratio should not exceed 3:1 for color or 5:1 for black and white to achieve the best results in the final print.

Use your gray card to determine the appropriate lighting arrangement to achieve the appropriate lighting ratio. To accomplish this, follow these steps:

1. Place the card in close proximity of the subject.
2. To read main plus fill-in illumination, position the card to the angle that gives the highest reading on the scale of your light meter. Typically this will be aimed in the direction of the main light. All lights should be on except for the lights that shine directly into the meter producing a false high reading. Record the reading.
3. To read fill-in illumination, position the card so it aims toward the camera lens and turn off the main light. Record the reading.
4. Use the table below to determine the lighting ratio. The table will give you the ratio of the area that receives illumination from both lights and the area that just receives the fill light.

Stops Difference	*Lighting Ratio*	*Stops Difference*	*Lighting Ratio*
2/3	1/5:1	2-2/3	6:1
1	2:1	3	8:1
1-1/3	2.5:1	3-1/3	10:1
1-2/3	3:1	3-2/3	13:1
2	4:1	4	16:1
2-1/3	5:1	5	32:1

To Determine Color Balance

The Gray Card may be used as a constant or standard that does not vary in your color printing. By including a gray card in the scene in which you are photographing, you are including a reference which records the color of light illuminating the scene. Color variations in lighting are the major reason for filtration variance in color printing. It may be necessary to print the gray card slightly off neutral to make the most accurate print. The reason for this is that films do not reproduce an absolute neutral gray when everything else in the print is balanced properly.

Place the gray card in the scene, making sure it is illuminated the same as the subject. By carefully placing the card in the scene, it can be masked out of the finished print or simply make two exposures, one with and one without the gray card.

Recommended Reading:

The New Zone System Manual by White, Zakia, Lorenz
The Zone VI Workshop by Fred Picker
Printing With Fred Picker (A Zone VI Photography Video)
Beyond the Zone System by Phil Davis
How To Use The Zone System For Fine B&W Photography by John P. Schaefer

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